

**Notice of Allowability**

Application No.

10/690,492

Examiner

Thanhha Pham

Applicant(s)

LEVY ET AL.

Art Unit

2813

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 06/16/2005 and interview dated 08/26/2005.
2. ☒ The allowed claim(s) is/are 1-31, 34-46, 51-52.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of the:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached  
1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.  
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |   |
|--|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date <u>08/30/05</u> | 7. <input type="checkbox"/> Examiner's Amendment/Comment                              |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material                               | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance             |
|  | 9. <input type="checkbox"/> Other _____   |

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Denis Bergin on 08/26/2005.

The application has been amended as follows:

- In claim 28,
  - line 4, after "reducing agent" insert – to form a layer of reducing agent on the substrate –
  - line 6, after "substrate" insert – including the layer of reducing agent –
  - line 7, change "(b) and (c) are performed sequentially in any order and together form a tungsten layer" to – (c) is performed after (b) to form a tungsten layer –
- Cancel claim 32
- In claim 43,
  - line 3, before "chamber" insert – multi-station reaction –
  - line 5, before "reaction" insert –multi-station –
  - line 6, before "reaction" insert –multi-station –
  - line 10, change "films" to – film –

line 11, after "layers" insert – of tungsten nitride, PNL-tungsten and CVD-tungsten –

- In claim 52,

line 3, before "chamber" insert –multi-station reaction –

line 4, before "chamber" insert –multi-station reaction –

line 7, change "the layered films" to -- the layered film –

line 8, after "layers" insert – of tungsten nitride and tungsten –

### ***Allowable Subject Matter***

2. Claims 1-31, 34-46 and 51-52 are allowed.

3. Claim 1 and 28 are generic and allowable. Accordingly, the restriction requirement as to the encompassed species is hereby withdrawn and claims 12-16, 23-24, 35-36, and 32 directed to the species are no longer withdrawn from consideration since all of the claims to this species depend from or otherwise include each of the limitations of an allowed generic claim.

In view of the above noted withdrawal of the restriction requirement as to the linked species, applicant(s) are advised that if any claim(s) depending from or including all the limitations of the allowable generic linking claim(s) be presented in a continuation or divisional application, such claims may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no

longer applicable. See *In re Ziegler*, 44 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.


4. The following is an examiner's statement of reasons for allowance: Recorded Prior Art fails to disclose or suggest the combination of the process steps of forming a tungsten nitride layer on a substrate as recited in the base claim 1 including depositing a gas phase boron-containing agent onto the substrate to form a boron-containing sacrificial layer on the substrate; exposing the boron-containing sacrificial layer to a tungsten containing precursor to form a tungsten layer; and exposing one or more additional cycles of tungsten nitride deposition to complete formation of the tungsten nitride layer wherein the additional cycles each comprise contact with reducing agent, tungsten containing precursor and nitriding agent. Recorded Prior Art also fails to disclose or suggest the combination of the process steps of forming a tungsten nitride layer on a substrate as recited in the base claim 28 including (b) exposing the substrate to a gas phase reducing agent to form a layer of reducing agent on the substrate; (c) exposing the substrate including the layer of reducing agent to a tungsten containing precursor wherein (c) is performed after (b) to form a tungsten layer; (d) exposing the tungsten layer to a nitriding agent to form a first portion of the tungsten nitride layer; and (e) repeating (b) to (d) for one or more cycles to complete formation of the tungsten nitride layer wherein one or more of the reducing agent, the tungsten containing precursor, and the nitriding agent comprise a different compound when employed to form the first portion of the tungsten nitride and when employed in (e).

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**DAVID BLUM**  
**PRIMARY EXAMINER**

Thanhha Pham